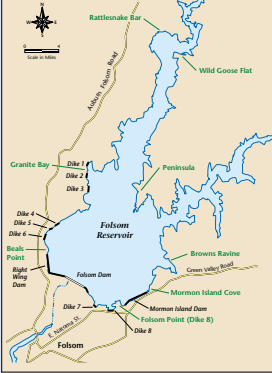


## Folsom Dam Raise Plan

### Folsom Reservoir Dikes and Recreation Areas

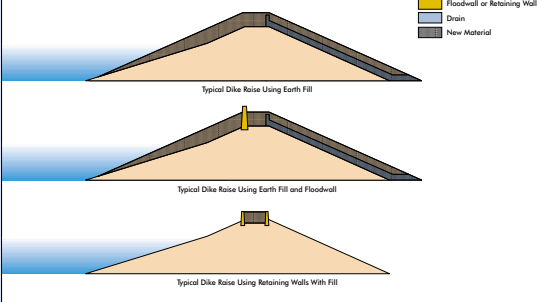


### Project Description

Under the Folsom Dam Raise Plan, Folsom Dam and Folsom Reservoir dikes would be raised to create additional reservoir storage space to be used exclusively for flood water storage.

Improvements would be designed so that they could be constructed and operated without affecting ongoing water conservation and hydropower operations. Additional improvements include a detour bridge across the American River downstream of Folsom Dam to minimize traffic impacts.

### Folsom Dam 12-Foot Raise Earth Fill Dike Sections



### Dam Raise Options

Different dam raise alternatives (raises of up to 12 feet) will be included in the evaluation of the Folsom Dam Raise Plan.

The plan would maintain the current Folsom Dam design flood control release of 115,000 cfs and the emergency release of 160,000 cfs.

Depending on the extent of the dam raise, the Folsom Dam Raise alternative could provide protection from a 210-year flood, which means a flood that has a 1-in-210 (less than 0.5%) chance of occurring in any given year.

### Potential Impacts

The environmental impacts associated with the Folsom Dam Raise Plan will be fully evaluated. These impacts could include:

#### Construction-Related Impacts

- Vegetation
- Wildlife
- Air quality
- Traffic/circulation
- Noise
- Recreation

#### Operation-Related Impacts

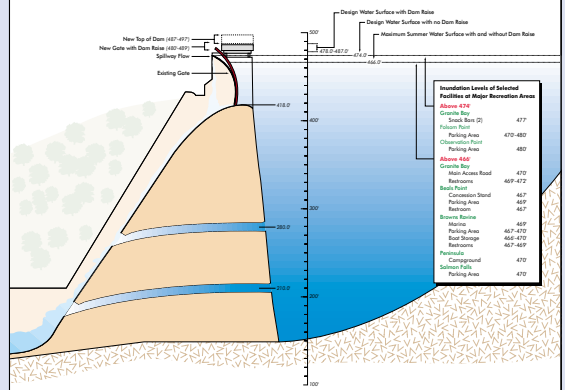
- Recreation
- Vegetation
- Wildlife
- Land use

### Key Issues

The key issues associated with the Dam Raise Plan include:

- How much flood protection can be provided?
- What are the estimated costs to construct, operate and maintain the new facilities?
- What effect will the dam raise have on the other uses of Folsom Reservoir?
- How will the construction process be designed?
- How long will construction last?
- What kind of bridge will be constructed to detour traffic from the top of the dam?
- How will traffic impacts be minimized?

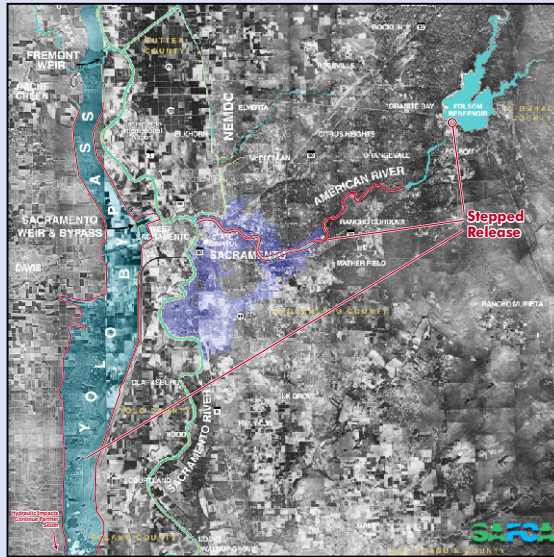
### Water Surface Elevations at Folsom Reservoir Under No Action (with Authorized Projects) and Folsom Dam Raise Alternatives



## Stepped Release

### Project Description

Under the Stepped Release Plan, the capacity of the American River channel below Folsom Dam would be increased to accommodate higher flood control releases from the dam. This could entail raising the American River levees up to 3 feet higher than their current elevation, modifying existing drainage and transportation infrastructure along the lower river, and raising and strengthening portions of the levee system along the Sacramento River and the Sacramento and Yolo Bypasses.



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### Stepped Release Options

The plan would be designed to preserve existing levels of service for infrastructure along the American River. It would also be designed to maintain the current flood protection capability of the levee system, protecting property outside the American River watershed, including property near the Sacramento and Yolo Bypasses.

#### Flood Control Releases

Options for increased channel capacity will be evaluated within this range:

- Increase design flood control release from 115,000 cubic feet per second (cfs) to 145,000 cfs; emergency release remains at 160,000 cfs.
- Increase design flood control release from 115,000 cfs to 145,000 cfs; emergency release increased to 180,000 cfs.
- Increase design flood control release from 115,000 cfs to 145,000 cfs; emergency release remains at 160,000 cfs with new outlet works at Folsom Dam.

Depending on the extent of the increase in channel capacity, this alternative could provide a level of flood protection as great as a 1-in-170 chance of flooding in any year.

### Potential Impacts

The environmental impacts associated with the Stepped Release Plan will be fully evaluated. These impacts could include:

#### Construction-Related Impacts

- Traffic/circulation
- Air quality
- Noise
- Vegetation
- Wildlife

#### Operation-Related Impacts

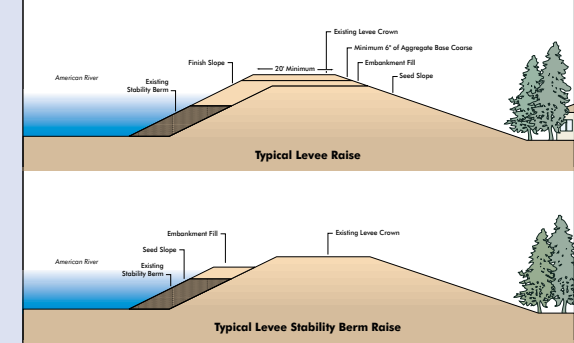
- Levee integrity
- Interior drainage
- Fisheries
- Transportation

### Key Issues

The key issues associated with the Stepped Release Plan include:

- How much flood protection can be provided?
- What are the estimated costs to construct, operate, and maintain the new facilities?
- What effect will changes in channel capacity have on lands protected by levees outside the American River watershed, including the Sacramento and Yolo Bypasses?
- How will the construction be designed?
- How long will construction last?
- How will the Howe Avenue Bridge be modified to accommodate the 180,000 cfs option?
- How will the plan affect the American River Parkway?

#### Levee Raise Cross Sections



## Project Description

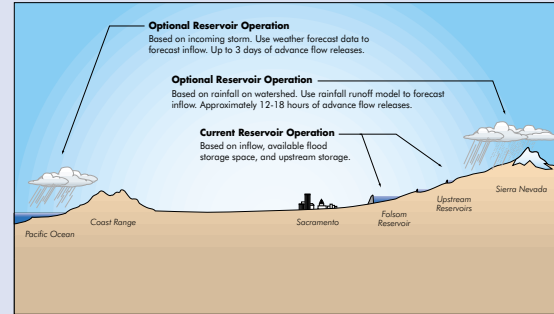
Currently, Folsom Dam flood releases are based on actual inflow to Folsom Lake. The Corps is in the process of updating the Folsom Flood Management Plan which will provide for advance releases that will not impact existing uses of the dam. These releases may be based on forecasting inflow from measured precipitation in the watershed or from weather data of incoming storms.

Under the Additional Anticipatory Release Plan, additional flood storage would be created within the existing configuration of Folsom Reservoir by releasing water from the reservoir based on forecasted flood inflows. Outflows from the reservoir would be allowed to exceed inflow. This alternative would augment the Flood Management Plan. This plan differs from the Flood Management Plan as it may impact water supply or other dam uses.

The Additional Anticipatory Release Plan would be designed to increase flood storage space only in anticipation of very large flood inflows so as to minimize the risk of any resulting impacts to the other uses of Folsom Reservoir. The plan would be operational in nature and would require no additional physical improvements to the dam.

## Anticipatory Release Options

Options would vary by how much in advance of peak inflow releases would be made, and by the amount of flow that would be released.



## Potential Impacts

The environmental impacts associated with Additional Anticipatory Release Plan will be fully evaluated. These impacts could include:

### Operation-Related Impacts

- Water Supply
- Hydropower
- Recreation
- Fisheries

## Key Issues

The key issues associated with the Additional Anticipatory Release Plan include:

- How reliable is the flood protection provided by the plan given the current state of weather forecasting?
- What affect could the plan have on other uses of Folsom Reservoir if anticipated reservoir inflows do not materialize?
- How will the potential costs of the plan be identified and funded?

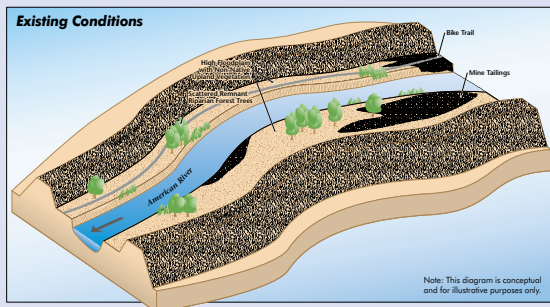
## Mission and Vision of Ecosystem Restoration: An Overview

Ecosystem restoration is one of the primary missions of the U.S. Army Corps of Engineers' (Corps') Civil Works program.

The purpose of ecosystem restoration is to restore significant ecosystem function, structure, and dynamic processes that have been degraded. The intent of restoration is to reestablish the attributes of a naturalistic, functioning, and self-regulating system.

The Corps' mission of protecting, restoring, conserving, and managing ecological resources has taken on greater importance over recent decades. The lower American River study is an example of evaluating habitat restoration opportunities as part of a broader regional water resources management program authorized by Congress.

The stated purpose of ecosystem restoration efforts is to comprehensively examine the problems that contribute to system degradation and to develop alternative means of solving these problems.



## Key Problems and Opportunities in the Lower American River Ecosystem

The combination of a century-and-a-half of mining, development, floodplain constriction, dam construction, and flow modifications have altered the physical processes that sustain ecosystem values, thereby contributing to significant degradation of the lower American River ecosystem. Some of the problems and opportunities within this ecosystem include:

**Problem: High floodplains** produced by deposition of sandy sediments from upstream hydraulic mining during the Gold Rush are disconnected from the ordinary flow of the river, except in very high flow events. Without a regular cycle of frequent inundation bringing water to the unnaturally high terraces and shallower water tables, native plant species cannot regenerate adequately.

**Opportunity:** Removing excess soil to reestablish more frequent inundation and a shallower water table facilitates a more natural hydrologic cycle for native plant establishment and makes a larger area subject to frequent inundation. This work results in healthy, diverse riparian communities and overall habitat improvement.

**Problem: Channel downcutting** between the high floodplain banks results in a lack of shallow aquatic habitat along channel edges, which is important to juvenile fish rearing. This also results in a lack of shallow, slow-water sidechannels and other off-channel aquatic habitats that are important to both fish rearing and fish spawning.

**Opportunity:** High quality fish rearing habitat can be created by cutting benches to lower bank elevations, or by constructing shallowly submerged fill benches along the channel edges, together with placing instream woody material and planting riparian vegetation near the shoreline.

**Problem:** The dry upland conditions of the high floodplains and the modified hydrologic cycle allow **invasive non-native plants** to outcompete the native species, because non-native plants are better adapted to these dry conditions. The system generally lacks vegetative cover and diversity.

**Opportunity:** Creating more frequent inundation, combined with removing invasive non-native species and planting native riparian plants, enhances ecological function.

**Problem: Dredger tailings** in the form of bars and deposits along the riverbanks and on the floodplain provide a poor substrate for riparian plants and less-than-optimal fish and wildlife habitat values. Upstream dams have eliminated transport of sediment downstream and slowed the development of substrate for plant colonization.

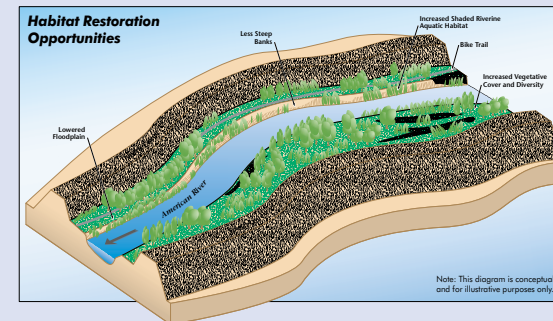
**Opportunity:** Removing and redistributing large river cobble, combined with reintroducing fine-grained bank material, may foster conditions more suitable for regeneration of native riparian vegetation.

**Problem:** Deep pools occur in several locations where the river captured abandoned gravel mining pits. These pools provide **habitat for predator fish** that prey on juvenile salmon.

**Opportunity:** Filling excessively deep pools, lowering the floodplain, developing sidechannels, and disposing of dredger tailings could eliminate predator habitat and increase juvenile salmon survival.

## Restoration Objectives for the Lower American River Ecosystem

1. Enhance values of plant, wildlife, and aquatic habitat.
2. Increase shaded riparian aquatic cover.
3. Increase the diversity of floodplain habitat.
4. Improve connectivity between the low-flow channel and river floodplains.
5. Enhance habitat for Sacramento splittail and anadromous fish.
6. Facilitate establishment of native plant species.
7. Enhance recreation and educational opportunities by developing high-quality riparian and aquatic habitats.
8. Ensure compatibility with flood control system and proposed improvements.



## Developing an Ecosystem Restoration Plan

This study will follow these steps:

- Identify sites in the lower American River that present promising restoration opportunities.
- Design measures appropriate to the sites that satisfy restoration objectives.
- Analyze and compare measures in terms of cost and effectiveness.
- Select a subset of the best measures to form a best alternative plan.

The American River Long Term Study will incorporate this ecosystem restoration plan with a flood control plan.